

26. STUDIES ON *COELOPHORA BISELLATA* MULS. (COLEOPTERA : COCCINELLIDAE)

1. FIELD RECOGNITION OF DIFFERENT LARVAL INSTARS AND THE TRAITS OF PUPAE AND ADULTS

(With nine text-figures)

INTRODUCTION

Coelophora bisellata Mulsant was originally described by Mulsant in 1850 from Bengal and Java. In 1910 Sicard described, from India, the variate *nudipennis* of *C. bisellata*. The occurrence of *C. bisellata* from various regions of Indian subcontinent has been reported since then but nothing is known about the biology of this insect. As studies on the predators, parasites and pathogens of the aphids are required for the effective biological control of the pests, the present investigation was undertaken to throw light on the bioecology of this ladybird beetle.

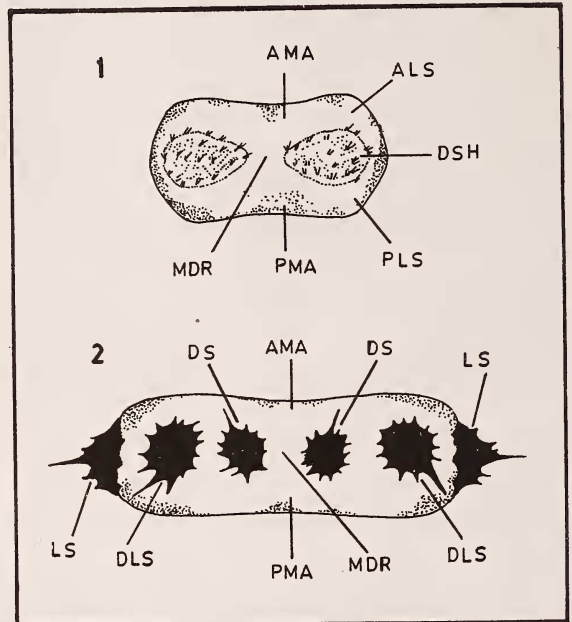
MATERIAL AND METHODS

The adult ladybird beetles, *C. bisellata* were collected from the wild and were reared in the laboratory in transparent plastic containers of 7 cm diameter and 3 cm height with enough pores on the lid for aeration.

The larvae were reared from the eggs laid by the gravid females. The measurements of the eggs, larvae, pupae and adults were determined using stage and ocular micrometer. The colour patterns of the larval instars, with the help of which one can recognise them in the field, are described in this paper. The larval colour patterns are used generally to identify the species without killing them, since these colour patterns are instar and species specific (Storch 1970, Miszczak 1974).

On the dorsal region of mesothorax and metathorax of the larvae a pair of dorsal shields are found, namely *mesosh* and *metash* (Storch 1970) (Figure 1). The different regions of the setal areas in an abdominal segment are shown in figure 2. The first eight abdominal segments have distinct setal areas arranged in a similar manner. Each tergum bears six setal areas, the dorsal setal area (DS), nearer to the dorsal mid-line, dorso-lateral setal area (DLS), lateral to the dorsal setae, and lateral setal area (LS), lateral to the dorso-lateral setae.

It has been observed that the colour is presumably due to deposition of metabolic by-product in the fat body or epidermis, which are visible through the transparent cuticle (Sterch 1970).



Figs. 1-2. *Coelophora bisellata* Mulsant

Larval segments showing the setal areas described in the text.

1. A thoracic segment; 2. An abdominal segment.

Abbreviations: ALS - Anterolateral side; AMA - Anterior marginal area; DLS - Dorsolateral setae; DS - Dorsal setae; DSH - Dorsal shield; LS - Lateral setae; MDR - Mid dorsal region; PLS - Postero lateral side; PMA - Posterior marginal area.

OBSERVATIONS

1. **Eggs:** Pale yellow, with smooth and shiny surface. Average length and breadth of 20 eggs 1.10 ± 0.06 mm and 0.58 ± 0.02 mm respectively. Free end more blunt and the posterior end tapering and attached to the substratum. The number of eggs in each batch ranges from 1 to 19 (Fig. 9), the average being 7.58 ± 3.26 . Average number of eggs/female is 325.83 ± 85.86 , the range being 171 to 561 in 24 females observed.
2. **Larvae:** The key for the identification of different larval instars has been given in Table 1 (Figs. 3 to 6).

THE KEY FOR THE IDENTIFICATION OF DIFFERENT LARVAL INSTARS OF *Coelophora bisellata* IN THE FIELD

Traits	I Instar	II Instar	III Instar	IV Instar
Colour	Freshly emerged ones are grey first and turn black after one or two hours.	As in first instar	As in first instar	As in first instar
Length x Breadth (mm.)	$1.70 \pm 0.05 \times 0.41 \pm 0.03$	$2.81 \pm 0.14 \times 0.63 \pm 0.08$	$5.82 \pm 0.11 \times 1.33 \pm 0.05$	$11.24 \pm 0.15 \times 2.16 \pm 0.23$
Prothorax	—	—	—	The peripheral area is grey.
Mesothorax	—	Three pale white spots on the dorsal side, of which two are anterior and one is posterior.	Has three white spots on the dorsal region, of which the posterior one is larger than the anterior ones. The anterolateral and posterolateral regions, on each side, have white spots.	Three white spots as in instar III; pale mid-dorsal line also develops.
Methorax	—	Has on the mid-posterior marginal area a white spot. Lateral setal area on each side is white.	Has three white spots on the dorsal region, of which the posterior one is larger than the two anterior spots; the antero lateral and posterolateral regions, on each side, have white spots.	Three white spots as in instar III; pale mid dorsal line also develops.
Abdominal Segment I	The dorso lateral and lateral setal areas, on each side, are white.	Dorso-lateral and lateral setal areas are white in colour, on each side.	Dorso-lateral and lateral setal areas are white in colour, on each side. As the larva grows, the mid-dorsal region develops a pale white patch.	Dorso-lateral and lateral setal areas are white. The mid-dorsal dorsal region between the dorsal setae is white.
Abdominal Segment II	—	—	—	A pale white mid dorsal spot develops.
Abdominal Segment IV	The setal areas of dorsal, dorsolateral and lateral sides are pale white.	Dorsal, dorsolateral and lateral setal areas are white.	Dorsal, dorsolateral and lateral setal areas are white.	Dorsal, dorsolateral and lateral setal areas are white.
Abdominal Segment V	—	—	The lateral setal area, on each side, is white.	Lateral setal area, on each side, is white.
Abdominal Segment VII	—	—	The posterior marginal area has a single white line, broken to form three segments.	The posterior marginal area has a single white line.
Abdominal Segment VIII	—	—	—	A pale white posterior marginal line in the grown up larvae.

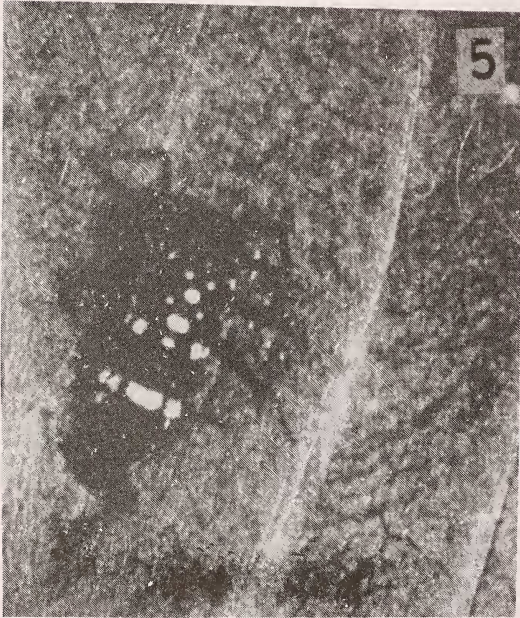
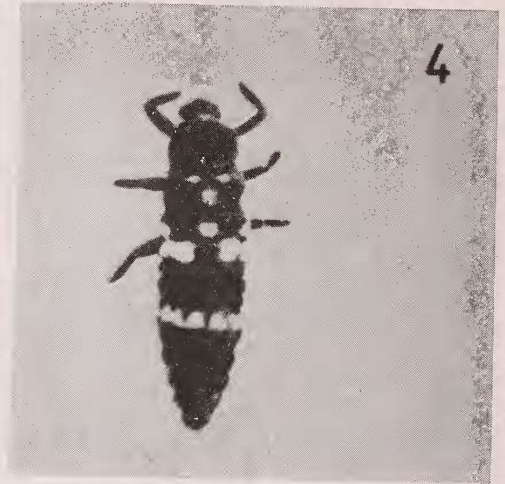


Fig. 3. The newly hatched I instar larvae, many of them clinging to the egg shells.

Fig. 4. II instar larva.

Fig. 5. III instar larva.

Fig. 6. IV instar larva.

3. **Pupa:** Pale yellow to deep yellow and not protected by larval skin (Fig. 7). The anal end of the pupa is covered by larval exuvium. Pronotum

with two large spots, mesonotum without any spots. Metanotum with two large black spots dorsally. The subhumeral and basal areas are

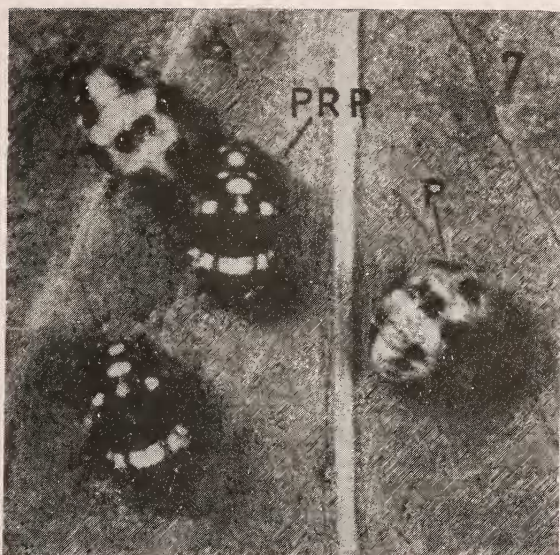
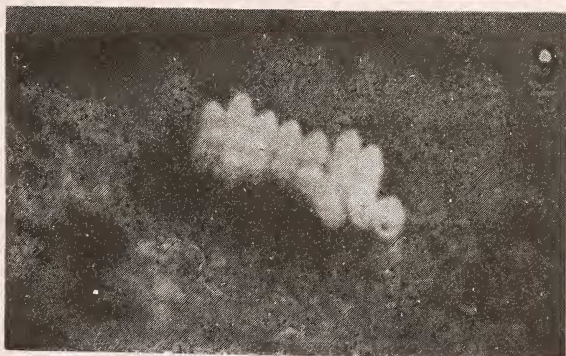
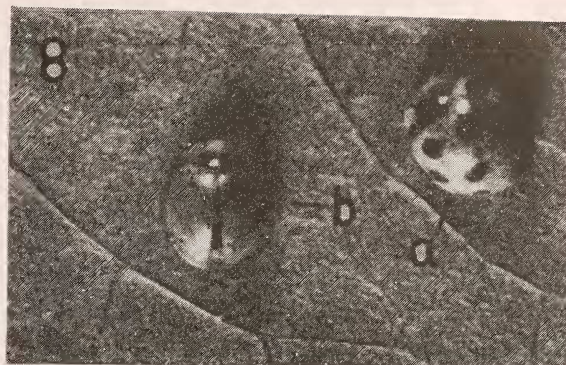


Fig. 7. Prepupae (PRP) and pupae (P).

Fig. 8. Adult beetles.

a. *C. bisellata* Mulsant nominate form. b. *C. bisellata* Muls. var. *nudipennis* Sicard.

Fig. 9. The egg cluster.



pale and median area black. Dorsal abdominal region with six large black spots. Pupae are often seen attached to the undersurface of the leaves, avoiding exposure to light and enemies. The average maximum length and breadth of the pupa are 5.80 ± 0.13 mm and 3.94 ± 0.21 mm respectively.

4. **Adult:** The pronotum has four black spots, of which the lateral ones are smaller. Each elytron has six spots, of which two are sutural (Fig. 8). The pronotal and elytral spots show intraspecific variations (Kapur 1959). In freshly emerged beetle, the ground colour of elytra is pale yellow. With increasing age, it changes from pale

yellow through deep yellow to orange. The nominate form with all the spots (Fig. 8a) is abundant throughout the year and the variate *nudipennis* Sic., in which the elytral spots are altogether absent (Fig. 8b), occurs predominantly during summer.

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